REMARKS

Claims 1-20 are pending. By this Amendment, claims 1-11, 13, 14, 16 and 18 have been amended to clarify the claimed subject matter. Claims 1-20 remain pending upon entry of this Amendment, with claims 1 and 11 being in independent form.

The specification was objected to as having informalities. Claims 1 and 11 were rejected under 35 U.S.C. §112, first paragraph, as purportedly failing to comply with the written description requirement. Claims 1-5, 7, 11-16 and 18 were rejected under 35 U.S.C. §112, second paragraph, as allegedly indefinite. Claims 1-10 were rejected under 35 U.S.C. § 101 because the claimed invention is purportedly directed to non-statutory subject matter.

The application has been amended to address the formal matters referenced in the Office Action. Withdrawal of the objection to the specification, the rejections under 35 U.S.C. §112 and the rejection under 35 U.S.C. §101 is respectfully requested.

Claims 1, 3, 6, 11, 13 and 16 were rejected under 35 U.S.C. § 102(a) as purportedly anticipated by Giger et al. (US 2001/0043729 A1). Claims 2, 4, 5, 7, 9, 12, 14, 15, 17 and 19 were rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Giger in view of Greenberg et al. (US 6,301,498) Claims 8 and 18 were rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Giger in view of Heilbrun et al. (US 2001/0039421 A1). Claims 10 and 20 were rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Giger in view of Greenberg and further in view of Knoplioch (US 6,643,533).

Applicant respectfully submits that the present application is allowable over the cited art, for at least the reason that the cited art does not disclose or suggest the aspects of the present application of calculating in an image a degree of deformation from normal shapes of the organ regions, storing a reference value of the normal shapes of the organ regions, and comparing the

reference value with the degree of deformation.

Giger, as understood by applicant, proposes an approach, as shown in Fig. 1 (reproduced below) of Giger, for computer-aided diagnosis utilizing automated computerized image analysis of an unknown mammographic case (i.e. image) wherein the radiologist selects criteria for a search to be performed, based on one or more features, or based on the computer estimate of the likelihood of malignancy, and upon input of the unknown case, the system extracts features of images in a known database, extracts features of the unknown case, calculates the similarity index, and displays the known cases along the probability distribution curves at which the unknown case exists. In such approach, the display shows both the computer classification output as well as images of lesions with known diagnoses (e.g., malignant vs. benign) and similar computer-extracted features.

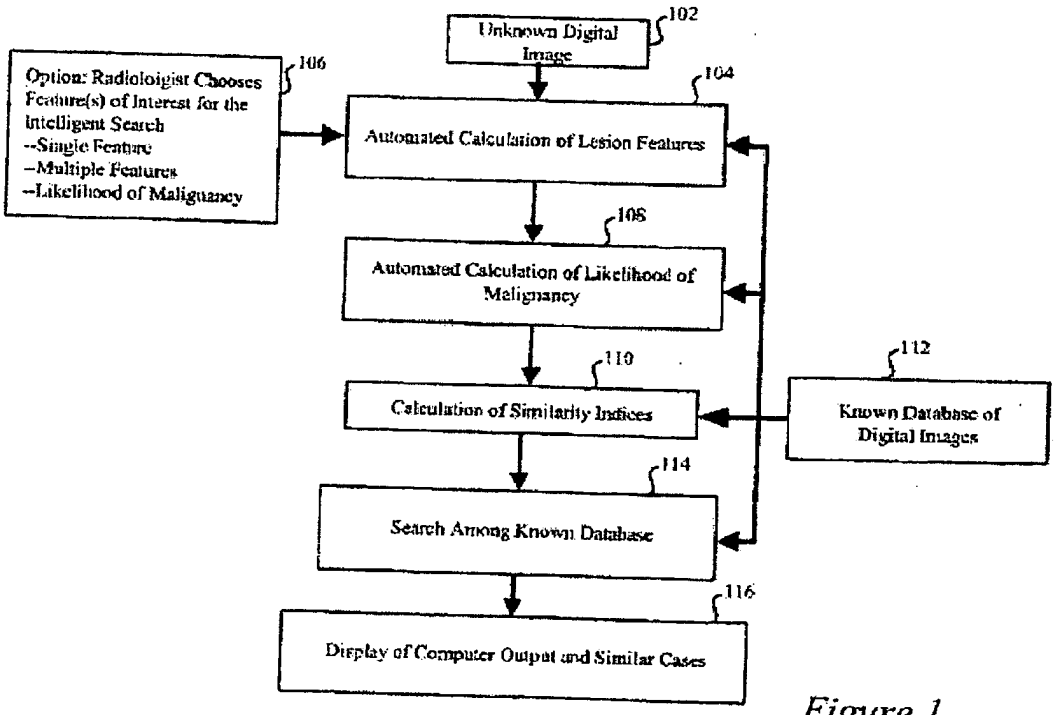

Figure 1

Giger, [0030], was cited in the Office Action:

> [0030] The overall scheme includes an initial acquisition of a set of known medical images that comprise a database, and presentation of the images in digital format. The lesion location in terms of estimated center is input from either a human or computer. The method, system and computer readable medium that employs an intelligent search workstation for the computer assisted interpretation of medical images consists of the following stages: access to a database of known medical images with known/confirmed diagnoses of pathological state (step 112), computer-extraction of features of lesions within the known database (step 104), input method for an unknown case (step 102), ***computer-extraction of features of lesion of the unknown case (step 104), calculation of likelihood of pathological state (e.g., likelihood of malignancy) for the known and unknown cases (step 108), calculation of similarity indices for the unknown cases relative to each of the known cases (step 110)***, search among the known database based on the calculated similarity indices (step 114) and ***presentation of the "similar" cases*** and/or the computer-estimated features and/or likelihood of pathological state (step 116). A specific example of the system is given for mass lesions in mammographic images in which the computer ***extracts features (step 104) and estimates the likelihood of malignancy for the known and the unknown cases*** (step 108), computes the similarity indices for each pair (step 110), and output cases that are similar in terms of individual features, combination of features, and/or computer-estimated likelihood of malignancy (step 116). The radiologist has the option of choosing various features, such as single feature, multiple features, likelihood of malignancy, etc., for the analysis (step 106).

Thus, Giger proposes the calculation of likelihood of malignancy of an unknown case (and calculation of likelihood of malignancy of the similar known case). According to Giger, [0044], such estimate of likelihood of malignancy is to be determined based on any of three methods, (i) a rule-based method, (ii) an artificial neural network, and (ii) a hybrid system. However, **none** of such methods (i), (ii) and (iii) involves calculating in an image a degree of ***deformation from normal shapes*** of the organ regions.

Stated another way, in the claimed subject matter of the present application, the degree of deformation is the difference between a ***normal*** shape and an abnormal shape of an organ.

In contrast, the objective of Giger is to match the unknown case to the most similar known case, and allow the radiologist to decide based on such information whether the unknown

case is malignant or not. On skilled in the art would not understand Giger to be proposing determining the degree of deformation based on the ***difference*** between a ***normal*** shape and an abnormal shape of an organ, since the approach of Giger clearly involves finding, and matching the unknown case to, the most ***similar*** known case.

While Giger proposes storing images of known cases in database, Giger says nothing whatsoever regarding storing a reference value of the normal shapes of the organ regions, so that the reference value can be compared to with the degree of deformation (that is, difference between ***normal*** shape and abnormal shape).

Greenberg and the other cited references (including Heilbrun and Knoplioch) likewise do not disclose or suggest the aspects of the present application of calculating in an image a ***degree of deformation*** from normal shapes of the organ regions, storing a reference value of the normal shapes of the organ regions, and comparing the reference value with the degree of deformation.

Applicant submits that the cited art, even when considered along with common sense and common knowledge to one skilled in the art, does ***NOT*** render unpatentable the above-mentioned aspects of the present application. To the contrary, the cited art would have guided one skilled in the art to match the unknown case to the most similar known case.

Accordingly, applicant respectfully submits that independent claims 1 and 11, and the claims depending therefrom, are allowable over the cited art.

In view of the remarks hereinabove, applicant submits that the application is now allowable, and earnestly solicits the allowance of the application.

If a petition for an extension of time is required to make this response timely, this paper should be considered to be such a petition. The Patent Office is hereby authorized to charge any required fees in connection with this amendment, and to credit any overpayment, to our Deposit

Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Respectfully submitted,

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